



Dioxin Facts

EPA Region 5 Records Ctr.



298160

Answers to Commonly Asked Questions

What is dioxin?

The word dioxin is a generic term for a group of 75 related compounds known as polychlorinated dibenzo-p-dioxins (PCDDs), but in popular use it usually refers to the most toxic and carefully studied of these compounds — 2,3,7,8-tetrachlorodibenzo-p-dioxin, or 2,3,7,8-TCDD, or simply TCDD.

Where does dioxin come from?

Nobody produces dioxin (TCDD) on purpose. It is an unwanted but almost unavoidable by-product that comes from manufacturing several commercial substances, chiefly the pesticide 2,4,5-trichlorophenol (2,4,5-TCP). This pesticide is then used as a basic ingredient in the manufacture of several other pesticides, including the herbicides 2,4,5-T and silvex, and the bactericide hexachlorophene. (Pesticide is a general term for chemical products used to destroy or control unwanted insects, plants, fungi, mites, rodents, bacteria, or other organisms.)

How does dioxin get into the environment?

TCDD can enter the environment in several ways; through chemical products contaminated with dioxin; as a component of the wastes that are produced in manufacturing these products; and through the widespread use of contaminated products. Combustion is another possible source of dioxin contamination.

Dioxin can enter waterways and soil in stormwater runoff, through industrial discharges, or by seeping from landfills that contain dioxin-contaminated wastes. Dioxin's solubility in water is quite low, but it attaches itself to soil particles, thus making it more likely to be found in the sediment than in the water itself.

Once in the environment, dioxin can be very persistent. Its half-life in soil is on the order of 5-10 years. Under special circumstances, however, the ultraviolet radiation in sunlight can degrade it over a shorter amount of time.

How does dioxin affect people?

Although scientists disagree on the long-term health effects of exposure to 2,3,7,8-TCDD, tests on laboratory animals indicate that it is one of the most toxic man-made chemicals known. Because information on effects to humans has come mostly from accidental exposures, the data are not definitive. Scientists do agree, however, that exposure to TCDD can cause a persistent skin rash called chloracne, as experienced by some workers exposed to dioxin in the work place or through industrial accidents. Tests on laboratory animals also indicate that exposure may result in a rare form of cancer called soft tissue sarcoma, liver dysfunction, elevated blood cholesterol, nervousness, and other problems.

Much controversy still exists over the use of Agent Orange, a dioxin-contaminated defoliant used during the Vietnam War, and whether some veterans and their children may be suffering from delayed effects of the chemical.

How do people generally come in contact with dioxin?

There are two exposure routes that present the greatest possibilities for health risks. One is through contact with

dioxin-contaminated soil and the other is through eating contaminated fish. Dioxin-contaminated soil presents a particular risk to children who ingest it.

At what levels is dioxin a danger to people?

The Centers for Disease Control (CDC) considers 1 part per billion (ppb) of dioxin in soil to be a level of concern in residential areas. (CDC is the federal agency EPA relies on to conduct site-specific exposure and risk assessments whenever hazardous pollutants are found in soil at high levels.) The Food and Drug Administration recommends limiting consumption of fish with 25 parts per trillion (ppt) or greater of dioxin to no more than one meal per week and not eating any fish with greater than 50 ppt of dioxin.

EPA, in conjunction with these federal agencies and State and local health agencies, will issue health advisories and alert people to any precautions they need to take whenever dioxin is detected at these levels. They will also decide what further actions are necessary.

Is it safe to swim or boat in water that contains dioxin?

Local health agencies post signs to alert people when they should not be using a particular body of water for recreational purposes. Since dioxin does not readily dissolve in water, but instead attaches to particles and eventually settles to the bottom, it is not likely to pose a threat to human health unless you disturb any sediment in which dioxin has settled. However, if you have any concerns whatsoever about the safety of the water, for any reason, ask the advice of your local health officials before swimming or boating.

Is it safe to drink water that contains dioxin?

Any drinking water that is suspected of being contaminated with dioxin or any other hazardous chemical should not be consumed. You should contact your local health department to find out the facts, or heed any advice they have given you. They will also advise you on whether or not you should be using an alternative drinking water source. Most water treatment plants can eliminate dioxin during the water treatment process by removing the sediment in which it collects.

Does dioxin affect animals?

The only known incident in the U.S. occurred in Missouri in 1971 when horse arenas were sprayed with high levels of dioxin-contaminated oil. Hundreds of horses became sick and 65 of them died.

What federal agencies are involved in dioxin detection and cleanup?

EPA regulates dioxin under the Toxic Substances Control Act and the Federal Insecticide, Fungicide, and Rodenticide Act and is developing regulations to control it in wastes under the Resource Conservation and Recovery Act. The Food and Drug Administration issues health advisories for dioxin in products for human consumption. The Occupational Safety and Health Administration has jurisdiction over dioxin exposure in the workplace. Issues associated with dioxin in

Agent Orange involving military personnel are handled by the Veterans Administration (VA) and the Department of Defense, although the VA has relinquished control of a project to investigate a link between dioxin and Vietnam veterans to the Centers for Disease Control.

What has industry done about the dioxin problem?

By 1965, some companies had changed their production processes and increased quality control practices in an attempt to reduce the levels of TCDD in the pesticide 2,4,5-T. As the controversy over dioxin increased, these companies instituted practices to further lower dioxin levels, and some companies ceased manufacturing the controversial product altogether. Today there is no domestic manufacturer of the pesticide 2,4,5-T.

What has the federal government done about the dioxin problem?

In 1970, the Department of Health, Education, and Welfare (now the Department of Health and Human Services), the Department of Agriculture, and the Department of Interior suspended many uses of the herbicide 2,4,5-T as a result of a report by the National Institute for Environmental Health Services that it caused birth defects in laboratory mice.

In 1970, the Department of Defense halted the spraying of Agent Orange in Vietnam and in 1978, the Veterans Administration created the Agent Orange Registry to identify veterans who are concerned about possible exposure to Agent Orange.

In 1979, on the basis of controversial evidence that linked forest spraying of 2,4,5-T with an increase in miscarriages among some Oregon women, EPA suspended use of silvex and 2,4,5-T on forests, rights-of-way and pastures, but still allowed spraying on rice fields, fence rows, vacant lots and lumberyards.

In 1981, the Centers for Disease Control began a study to determine if Vietnam veterans are at a greater risk of having children with birth defects.

In 1981, the Food and Drug Administration banned the use of hexachlorophene in nonprescription soaps and deodorants.

In 1981, the Food and Drug Administration recommended that people not eat fish with dioxin levels greater than 50 ppt, and limit their consumption of fish with 25-50 ppt of dioxin. Fish with dioxin below the 25 ppt level are considered safe to eat.

In 1982, EPA required some industries to certify that they were no longer using chlorophenol-type compounds as slime control agents.

In 1983, EPA proposed cancellation of all remaining 2,4,5-T and silvex products. This action was appealed at a hearing by a number of pesticide registrants and users. Until the hearings are completed, as required by law, limited use of 2,4,5-T and silvex may continue.

In 1983, EPA initiated a National Dioxin Strategy to look for areas throughout the country where 2,3,7,8-TCDD may be present in the environment. The strategy provides a systematic framework under which the agency will study the nature of dioxin contamination throughout the U.S. and the risks to people and the environment; clean up dioxin-contaminated sites that threaten public health; find ways to prevent future contamination; and find ways to destroy or dispose of existing dioxin. A National Dioxin Study to investigate the nature and extent of dioxin contamination in the environment will begin this summer and take from 12-15 months. Air, water, soil, and fish sampling will take place in over 1,000 locations across the country.

In 1984, EPA issued a water quality criteria document for 2,3,7,8-TCDD.

Are there ways to safely dispose of or destroy dioxin?

EPA is currently evaluating methods of disposing of or destroying dioxin-contaminated soils and wastes. Established technologies include incineration, chemical degradation, and biological treatment measures, but EPA is working to find other methods of disposal as well. One promising technique is to treat soil with a chemical compound and sunlight. This method holds promise for actually detoxifying the dioxin molecule. Another alternative that is being investigated involves the use of solvents to change dioxin into a soluble form capable of destruction.

Some temporary methods to limit exposure include: excavating highly contaminated soil and removing it to a secure landfill or concrete vault; securing and capping the contaminated area; and using high efficiency vacuums and liquid dust suppressants.

Who can I contact if I have more questions about dioxin?

Each of EPA's 10 regional offices has a community involvement contact who can answer your questions about dioxin. Following are their names, addresses, and telephone numbers.

Debra Prytla Office of Public Affairs U.S. EPA Region 1 JFK Federal Building Boston, MA 02203	(617) 223-4906	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont	Betty Williamson Office of Public Affairs U.S. EPA Region 6 1201 Elm St. Dallas, TX 75270	214) 767-9986	Arkansas, Louisiana, Oklahoma, Texas, New Mexico
Richard Cahill Office of Public Affairs U.S. EPA Region 2 26 Federal Plaza New York, NY 10007	(212) 264-2515	New Jersey, New York, Puerto Rico, Virgin Islands	Steven Wurtz Office of Public Affairs U.S. EPA Region 7 324 E. 11th St. Kansas City, MO 64106	(816) 374-5894	Iowa, Kansas, Missouri, Nebraska
Joe Donovan Office of Public Affairs U.S. EPA Region 3 6th and Walnut Sts. Phila., PA 19106	(215) 597-9370	Delaware, Maryland, Pennsylvania, Virginia, West Virginia, District of Columbia	Nola Cook Office of Public Affairs U.S. EPA Region 8 Suite 900 1860 Lincoln St. Denver, CO 80295	(303) 837-5927	Colorado, Utah, Wyoming, Montana, North Dakota, South Dakota
Hagan Thompson Office of Public Affairs U.S. EPA Region 4 345 Courtland St., NE Atlanta, GA 30308	(404) 881-3004	Alabama, Georgia, Florida, Mississippi, North Carolina, South Carolina, Tennessee, Kentucky	Deanna Wieman Office of External Affairs U.S. EPA Region 9 215 Fremont St. San Francisco, CA 94105	(415) 974-8083	Arizona, California, Nevada, Hawaii, American Samoa, Guam
Vanessa Musgrave Office of Public Affairs U.S. EPA Region 5 230 S. Dearborn Chicago, IL 60604	(312) 886-6128	Illinois, Indiana, Ohio, Michigan, Wisconsin, Minnesota	Bob Jacobson Office of Public Affairs U.S. EPA Region 10 1200 Sixth Ave. Seattle, WA 98101	(206) 442-1203	Alaska, Idaho, Oregon, Washington



Dioxin Facts

Study Site Categories in EPA'S National Dioxin Strategy

Overview

In December 1983, the U.S. Environmental Protection Agency (EPA) announced a National Dioxin Strategy to determine the extent of dioxin (2,3,7,8-TCDD) contamination throughout the country. The strategy provides a systematic framework under which the Agency will:

1. study the nature of dioxin contamination throughout the U.S. and the risks to people and the environment.
2. clean up dioxin-contaminated sites that threaten public health;
3. find ways to prevent future contamination; and
4. find ways to destroy or dispose of existing dioxin.

To carry out its dioxin strategy, EPA established seven categories (tiers) of sites for investigation and study. These sites range from those that are most probably contaminated to those where there is no advance expectation of finding contamination.

EPA believes over 80 percent of the dioxin will be found in the Tier 1 and 2 sites. The other study tiers, where EPA believes 10-20 percent of the dioxin may be located, comprise a National Dioxin Study which begins in the summer of 1984 and will take from 12-15 months.

Dioxin

The word dioxin is actually a generic term for a group of compounds known as polychlorinated dibenzo-p-dioxins (PCDDs), but in popular use it usually refers to the most toxic and carefully studied of these compounds — 2,3,7,8-tetrachlorodibenzo-p-dioxin, or 2,3,7,8-TCDD, or TCDD. Whenever we discuss dioxin in this fact sheet, we are referring to 2,3,7,8 — TCDD.

Nobody produces dioxin on purpose. It is an unwanted but almost unavoidable by-product that comes from manufacturing several commercial substances, chiefly the pesticide 2,4,5-trichlorophenol (2,4,5-TCP). This pesticide is then used as a basic ingredient in the manufacture of several other pesticides.

Tier I Production Sites

EPA has already investigated and confirmed dioxin contamination at most of the ten sites where 2,4,5-TCP was produced. At many of these locations, companies are undertaking cleanup or are engaged in negotiations with EPA. Additional investigations will be made where appropriate, and Superfund authority will be used to clean up these locations if removal or

remedial actions are needed. EPA is still in the process of identifying locations where wastes from these production facilities might have been disposed.

Tier 2
Precursor Sites

Tier 2 includes nine sites where 2,4,5-TCP was used as a precursor to make other chemical products such as silvex, 2,4,5-T and hexachlorophene. Initial sampling has been completed at most sites. The waste disposal sites associated with these facilities will ultimately be included in this tier.

Tier 3
Formulation Sites

Tier 3 consists of sites and associated waste disposal sites where 2,4,5-TCP and its derivatives were formulated into herbicide products. Approximately 60 to 70 sites will be sampled between October 1983 and October 1985.

Tier 4
Combustion Sites

EPA also will be investigating the possibility that various combustion processes produce dioxin. Examples of combustion sources to be studied include hazardous and municipal waste incinerators, internal combustion engines, and accidental fires involving PCB-transformers.

Tier 5
Commercial Use
Sites

This tier includes sites where pesticides that may be contaminated with 2,3,7,8-TCDD have been used or are being used on a commercial basis for a variety of agricultural and silvicultural activities. Examples of these uses include clearing power line rights-of-way of brush and vegetation, and as a pesticide for rice and sugar cane fields in the Southern United States and in forests of the Pacific Northwest. Approximately 20 to 30 sites are scheduled for testing.

Tier 6
Quality Control
Problem Sites

In this tier, EPA will test certain organic chemical and pesticide manufacturing facilities where improper quality controls may have resulted in the production of 2,3,7,8-TCDD. Approximately 20 sites will be investigated.

Tier 7
Control Sites

These are sites where EPA least expects to find dioxin. They have been included as part of study as "control" sites to determine if there are "background" levels of dioxin in the environment and, if so, how widespread they are. Soils at 500 randomly selected sites across the country — 200 in rural areas and 300 in urban areas — will be sampled between July 1984 and July 1985. Fish will be sampled from over 400 locations, including streams throughout the U.S., the Great Lakes, and coastal and estuarine waters.